



Lexington's Path to Zero Waste

Department of Public Works
Town of Lexington

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Executive Summary

Lexington is on the path to Zero Waste. Implementation of the Zero Waste initiatives identified in this plan, will increase Lexington's overall waste diversion rate from 60% to 90% within 10 years.

To achieve this, Lexington will implement new and expanded policies, programs and infrastructure to reduce waste and increase reuse, recycling and composting.

This plan identifies the policies, programs and infrastructure that will be developed over the short-term (1-3 years), medium-term (4-7 years), and long-term (8-10 years).

In the short-term, Lexington will initiate **changes to the collection system** to ensure that all residents, businesses, and institutions have comprehensive recycling and compost collection services. Lexington will also prioritize **outreach & education** and **technical assistance** to ensure that residents, businesses, and institutions have the information and support to reduce waste and fully participate in the expanded collection programs.

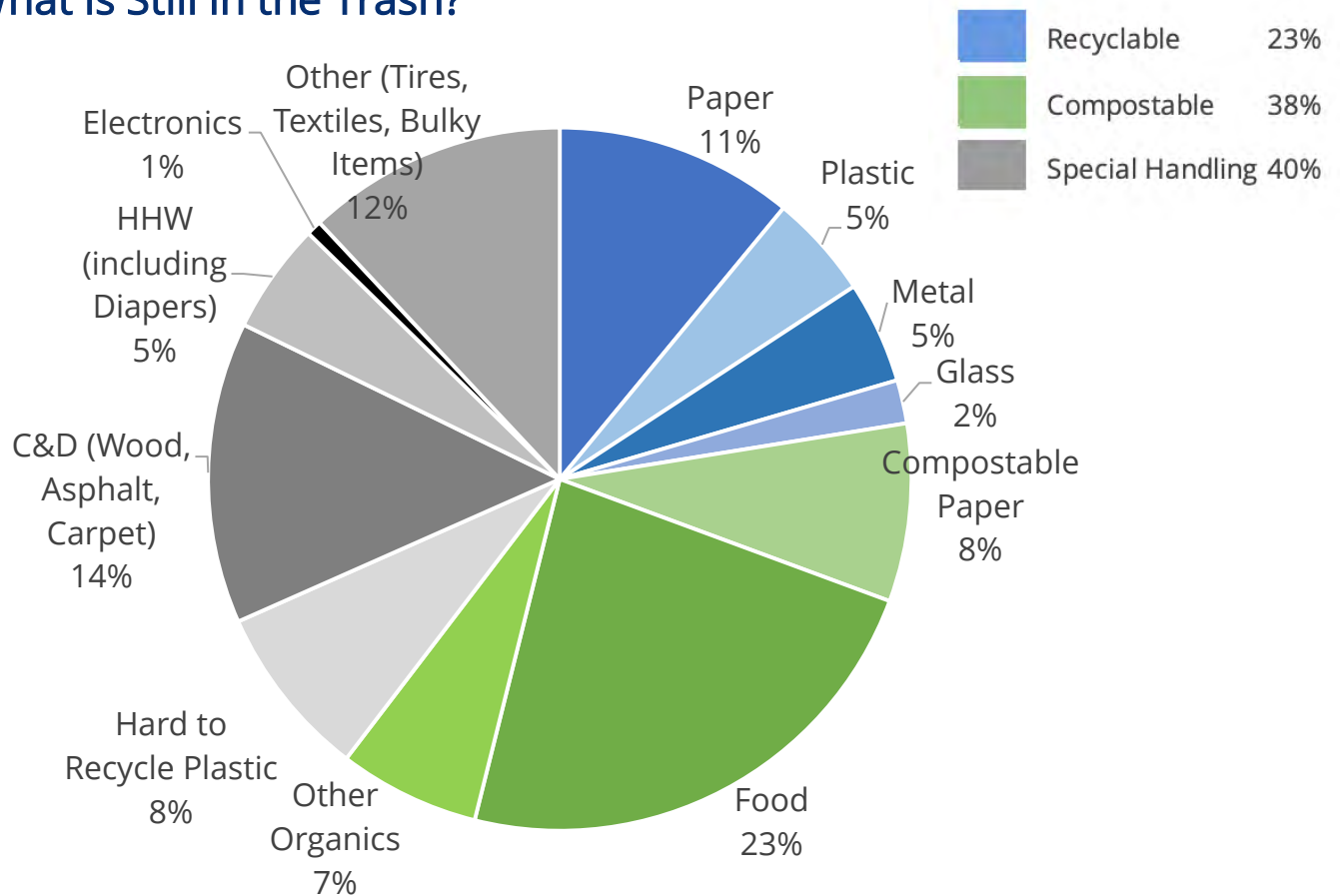
In the medium-term, Lexington will consider new product policies and foodware requirements and expand reuse, recycling and composting infrastructure at Hartwell. In the long-term, Lexington will consider mandatory participation requirements, deconstruction, construction & demolition debris recycling requirements, and enforce state bans.

This will increase Lexington's diversion rate incrementally over time.

Timeframe	Diversion Rate
Current (as of 2021)	60%
Short-Term (1-3 years)	72%
Medium-Term (4-7 years)	79%
Long-Term (8-10 years)	90%

Most of what is thrown away as trash is recyclable or compostable. The largest component (23%) is food. As much as 38% is compostable, 23% is recyclable, and 40% requires special handling.

What is Still in the Trash?



Wheelabrator North Andover, Inc. 2022 Waste Characterization Study Report, MSW Consultants

Twenty-two Zero Waste initiatives within seven categories are included in this plan. The initiatives were identified and researched by the Town's Zero Waste Planning Working Group and vetted through a stakeholder outreach process. More community input and engagement will be conducted as the initiatives are further refined and designed for implementation.

Lexington's Zero Waste Initiatives

Changes to the Collection System

- Expand compost collection Town-wide
- Convert to automated collection with wheeled carts
- Evaluate rate structure incentives
- Evaluate every other week trash collection
- Provide reuse collection



Watertown, MA Compost, Recycling & Trash Collection

Outreach & Education

- Expand outreach and education efforts to assist all generators (residential, commercial, institutional) to reduce, reuse, recycle and compost



Lexington Green Teams

Technical Assistance & Enforcement

- Provide school & business assistance
- Enact mandatory participation
- Enforce State Bans
- Certify Green Businesses



Recycling Works Massachusetts

Lead by Example

- Expand Environmentally Preferable Purchasing
- Invest in carbon farming
- Provide market development incentives



UMass Carbon Farming Initiative

Expand Infrastructure at Hartwell

- Evaluate food scrap composting
- Expand recycling/reuse drop-off
- Develop glass processing
- Develop education center
- Expand building materials reuse



Lexington Composting Facility (Ecoverse Industries)

Deconstruction,
Construction & Demolition
Recycling Requirements

- Adopt deconstruction requirements
- Adopt C&D recycling requirements



Recycling Works Massachusetts Deconstruction Case Study

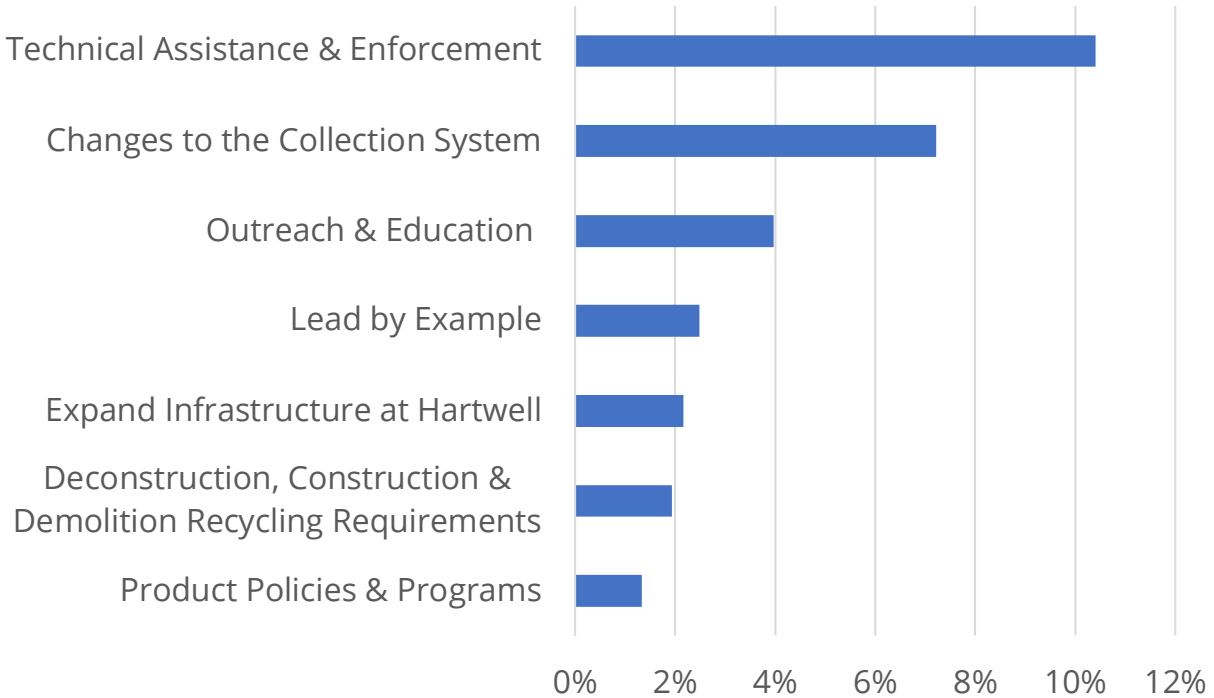
Product Policies &
Programs

- Expand Product Policies
- Require reusable Foodware



LexZeroWaste Zero ToGo Reusable Takeout

The Zero Waste initiatives build on each other and will be implemented over the short-term (1-3 years), medium-term (4-7 years) and long-term (8-10 years). Together, they will increase Lexington's diversion rate by 30%.



Implementation of the Zero Waste Initiatives will require the Town to invest in dedicated staff or contractor support, new or extended contracts, and investment in expanded infrastructure. Changes to the programs may result in additional costs or cost savings to Lexington residents and businesses.

Zero Waste Initiatives	Staff or Volunteer Support	Consultant, Contractor or Infrastructure Costs
Changes to the Collection System	1,000 hours (one-time) 250 hours (annual)	\$50,000 (one-time)
Outreach & Education	250 hours (annual)	\$25,000 (one-time) \$25,000 (annual)
Technical Assistance & Enforcement	100 hours (annual)	\$10,000 (one-time) \$50,000 (annual)
Lead by Example	250 hours (annual)	
Expand Infrastructure at Hartwell	1,000 hours (one-time)	\$2-3 million (one-time)
Deconstruction, Construction & Demolition Recycling Requirements	500 hours (annual)	\$50,000 (one-time)
Product Policies & Programs	500 hours (annual)	\$50,000 (one-time)
Totals	1,850 hours (annual) 2,000 hours (one-time)	\$75,000 (annual) \$185,000 (one-time contractor support) \$2-3 million (one-time infrastructure)

Introduction

On April 6th, 2022, the Lexington Town Meeting adopted a Zero Waste Resolution (Article 27), which called for the Town of Lexington to:

1. Adopt and model the Guiding Principles of Zero Waste as overarching goals for the community and all municipal and school operations.
2. Develop a Zero Waste Plan as soon as possible that would:
 - Include input from multiple stakeholders, including residents and Town staff
 - Establish goals that meet or exceed the state's 2030 Solid Waste Master Plan waste reduction goals
 - Recommend short- and long-term actions that address infrastructure, policies, local and regional collaboration, education and community engagement
 - Plan for town-wide compost services
 - Provide a cost/benefit analysis on each waste reduction strategy under consideration
 - Prioritize solid waste reduction programs that minimize the impact on environmental justice communities.

In June 2022, the Town convened a Zero Waste Planning Working Group, consisting of both Town staff and residents, to oversee the development of the plan and to ensure that the plan reflected the needs and desires of the community.

Why is Lexington Pursuing Zero Waste?

Trash generated in Lexington is burned in the North Andover incinerator and ash from the incinerator is buried in Shrewsbury. These facilities are adjacent to Environmental Justice communities that are financially disadvantaged, minority, and English isolated populations, who face disproportionate environmental burdens and are at disproportionate risk for negative health outcomes.

Lexington has a long and strong history of taking action related to environmental issues, and especially in the last 15 years in promoting and supporting programs that would address climate change at the municipal level. As the challenges related to disposing of solid waste have become clearer in Lexington, the opportunities and resources have also become more evident.

Most of the trash generated in Lexington consists of both readily recyclable and compostable materials. Transitioning from the linear system of “take-make-waste” to a circular model where discarded materials are made into new products, will reduce pollution and make Lexington a more sustainable community.

What is Zero Waste?

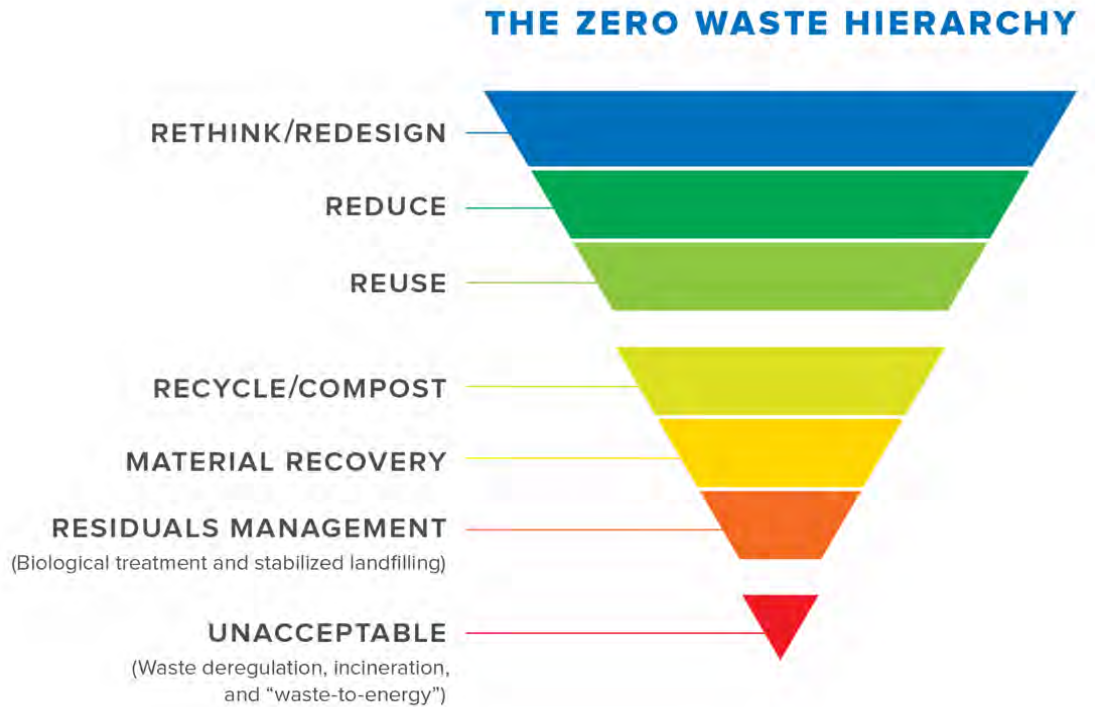
The internationally peer-reviewed definition has been curated by the Zero Waste International Alliance:

Zero Waste is the conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.¹

Zero Waste is an aspirational goal like zero accidents on the job site and zero defects in manufacturing. Recognizing that there will continue to be some “legacy materials” generated in prior decades that must continue to be landfilled at the end of their useful life (such as treated wood and asbestos), the Town’s performance measure for Zero Waste is 90 percent diversion from landfills and incinerators.

The Zero Waste Hierarchy of Highest and Best Use describes a progression of policies, programs and infrastructure to support the development of a Zero Waste system, from highest and best to lowest use of materials.

¹Zero Waste International Alliance, Zero Waste Definition <https://zwia.org>



The components of the Hierarchy are:

- **Rethink/Redesign** – Design and purchase products/materials from reused, recycled or sustainably-harvested renewable, non-toxic materials to be durable, repairable, reusable, fully recyclable or compostable, and easily disassembled.
- **Reduce** – Minimize quantity and toxicity of materials used. Reduce consumption.
- **Reuse** – Maximize reuse of materials and products.
- **Recycle/Compost** – Support and expand systems to keep materials in their original production loop and to protect the full usefulness of the materials.
- **Material Recovery** – Maximize material recovery from mixed discards and research purposes after extensive source separation.
- **Residuals Management** – Examine materials that remain and use this information to refine the systems to rethink, reduce, reuse, and recycle in order to prevent further discards. Biologically stabilize materials prior to landfilling.
- **Unacceptable** – incineration and other “waste-to-energy” or “waste-to-fuels” schemes.

Background

The Environmental Services Department manages the reuse, recycling, yard waste composting and trash collection programs within Lexington. The most significant existing policies, programs, and infrastructure to reduce waste are listed below.

Town-Specific Actions and Policies

- [Zero Waste Resolution](#)
- [Plastic Reduction Bylaws](#) – eliminates the usage of thin-film single-use plastic bags, expanded polystyrene foodware and packaging, and single use plastic straws by all retail and grocery stores
- [Lexington Public Schools Food Share Program](#) - Standard Operating Procedures for surplus food donation and food share tables in cafeterias
- [Lexington Public School District Waste Reduction: Conservation, Recycling And Composting Policy](#) - makes waste reduction and resource conservation an integral part of the operation of the school district and of the school curriculum
- [Demolition permit](#) – prior to permit approval, Superintendent of Environmental Services reviews and signs off on permit applications to ensure recovery of mercury containing items, and promotes building materials recovery

Programs

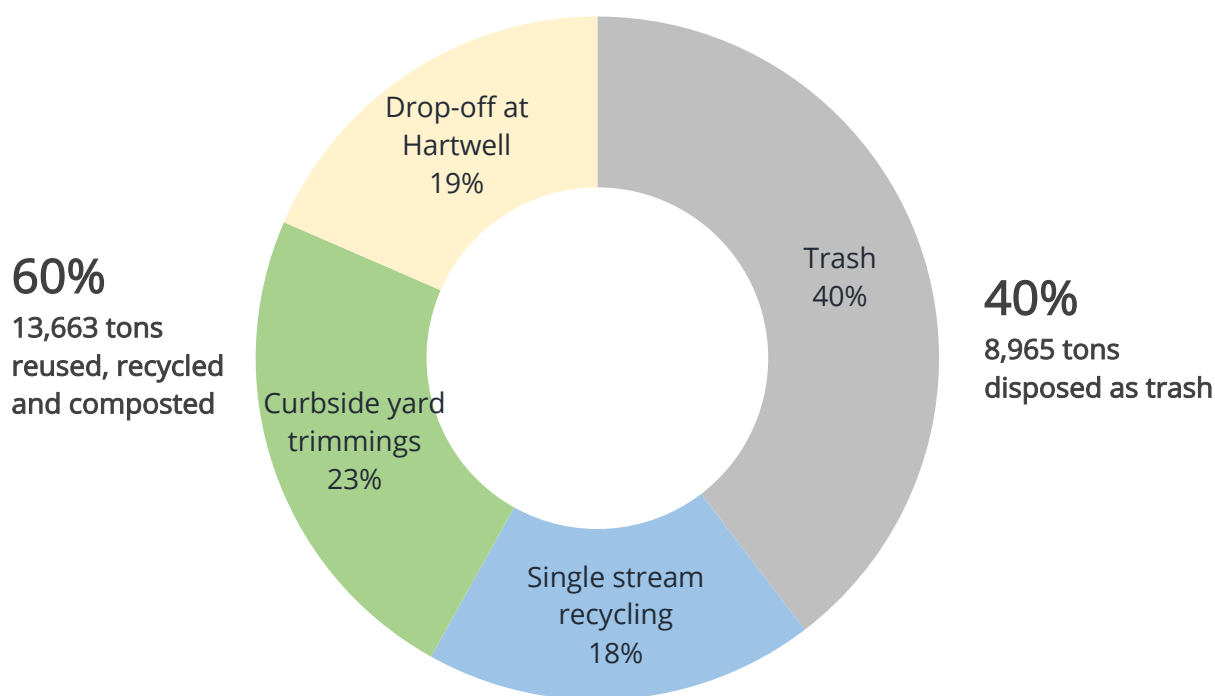
- Single-family residential curbside collection for recycling (weekly), trash (weekly), yard trimmings (seasonally), Christmas trees (seasonally), textiles and reusable household items (on-call), mattresses (on-call), electronics, scrap metal, appliances (on-call), food waste (by subscription), food waste drop-off (on-call)
- Multifamily and commercial recycling and trash collection (by subscription)
- School recycling and food waste collection
- Food waste collection for staff at the Public Service Building and the Community Center

Infrastructure

- Minuteman Household Hazardous Products Facility – regional hazardous waste program for household chemicals, pesticides and herbicides, automotive fluids, and paint
- Hartwell Facility – drop off for yard waste, cardboard, items containing mercury, scrap metal, car batteries, propane tanks, textiles, bicycles, and donations including books, CDs, DVDs, and video games
- LexSORT - Free Community Composting Pilot Program – food waste drop-off
- Medical Waste drop-off – sharps, needles, syringes and expired medicine
- Paper shredding

Lexington's Diversion Rate

In 2021, Lexington had an overall diversion rate of 60%, with 13,663 tons of materials were reused, recycled or composted and 8,965 tons disposed of as trash.



Town of Lexington, 2021 DEP data calculation sheet

Stakeholder Engagement

A key difference between a traditional solid waste management plan and a Zero Waste planning process, is the focus on stakeholder outreach.

Zero Waste requires a change in behavior. Changing behavior requires understanding the barriers and benefits of the proposed actions (reducing waste, recycling and composting more) and developing new or expanded policies and programs to overcome the perceived barriers to take advantage of the potential benefits.

Understanding requires engagement. Listening sessions, a Town-wide survey, and Zero Waste Planning Working Group meetings were conducted to obtain input on the guiding principles, policies, programs and infrastructure to be included in the Zero Waste Plan.

A summary of the listening sessions and the results of the Town-wide survey are included in Appendix A.

Listening Sessions

Listening sessions were conducted with community, school and business representatives

Town-wide Survey

524 residents responded over an 8-week period between July and September 2022

Zero Waste Planning Working Group

Five meetings of the Zero Waste Planning Working Group

Guiding Principles

Zero Waste is a holistic approach to managing the flow of resources through society in a closed loop system (circular economy) rather than a linear one. While Zero Waste includes the traditional hierarchy of reducing, reusing and recycling, it is much more. Zero Waste principles provide guidance on how resources are managed, from product design through ultimate disposal. Zero Waste is about designing products and packaging to minimize waste, creating incentives to encourage clean and sustainable products and processes, fostering both producer and consumer responsibility, investing in resource recovery facilities, strengthening local economies, and building community collaboration. This Zero Waste Plan uses the following guiding principles:

Follow the Zero Waste hierarchy with a particular focus on upstream measures of reduce and reuse

Lead by example in Town operations, facilities, and schools

Educate everyone to change the culture of wasting

Collaborate with institutions, community organizations, and local businesses

Invest in clean air and healthy soil

Look at long-term costs and benefits when designing solutions

Consider Environmental Justice impacts in decision making

Zero Waste Initiatives

Twenty-two Zero Waste initiatives were identified for implementation in the short-term (1-3 years), medium-term (4-7 years) and long-term (8-10 years).

The Zero Waste initiatives were grouped into seven categories to evaluate their potential impacts, planning level costs, and strategies for implementation.

Changes to the Collection System	<ul style="list-style-type: none"> Expand compost collection Town-wide Convert to automated collection with wheeled carts Evaluate rate structure incentives Evaluate every other week trash collection Provide reuse collection
Outreach & Education	<ul style="list-style-type: none"> Expand outreach and education efforts to assist all generators (residential, commercial, institutional) to reduce, reuse, recycle and compost
Technical Assistance & Enforcement	<ul style="list-style-type: none"> Provide school & business assistance Enact mandatory participation Enforce State Bans Certify Green Businesses
Lead by Example	<ul style="list-style-type: none"> Expand Environmentally Preferable Purchasing Invest in carbon farming Provide market development incentives
Expand Infrastructure at Hartwell	<ul style="list-style-type: none"> Evaluate food scrap composting Expand recycling/reuse drop-off Develop glass processing Develop education center Expand building materials reuse
Deconstruction, Construction & Demolition Recycling Requirements	<ul style="list-style-type: none"> Adopt deconstruction requirements Adopt C&D recycling requirements
Product Policies & Programs	<ul style="list-style-type: none"> Expand product policies Require reusable foodware

These initiatives include both new or expanded policies (rules to be adopted by Select Board and/or Town Meeting), new or expanded programs (to be implemented by Town staff), and new or expanded infrastructure to be developed by Hartwell or regionally.

	Short-Term 1-3 Years	Medium-Term 4-7 Years	Long-Term 8-10 Years
Policies	1. Expand Environmentally Preferable Purchasing	8. Invest in carbon Farming 9. Provide market development incentives 10. Expand product policies 11. Require reusable foodware	19. Adopt deconstruction requirements 20. Adopt C&D recycling requirements
Programs	2. Expand outreach & education 3. Convert to automated collection with wheeled carts 4. Expand compost collection Town-wide 5. Evaluate rate structure incentives 6. Evaluate every other week trash collection 7. Provide reuse collection	12. Provide school & business assistance 13. Certify Green Business	21. Enact mandatory participation 22. Enforce State Bans
Infrastructure		14. Evaluate food scrap composting 15. Expand recycling/ reuse drop-off 16. Develop glass processing 17. Develop education center 18. Expand building materials reuse	

These Zero Waste initiatives were discussed by the Zero Waste Planning Working Group, refined through the public outreach process, and evaluated for inclusion in the plan.

Initiative Descriptions

Short-Term (1-3 Years)

1. **Expand Environmentally Preferable Purchasing** – Expand on Lexington’s initial research into environmental preferable purchasing for all Town departments using the model developed by the Massachusetts Operational Services Division.
2. **Expand outreach & education** – Expand outreach and education efforts to assist all generators (residential, commercial, institutional) to reduce, reuse, recycle and compost. This initiative includes a number of components to enhance the Town’s current recycling and organics programs to ensure that all residents and businesses have the information and tools to reduce, reuse, recycle and compost correctly.

In order to change people’s behavior, they need to be contacted 7-15 times from different sources to reinforce the message and detail the behavior desired. An initial education video can explain Zero Waste and refer viewers to an informative website laying out the Zero Waste Plan, bylaws, timeline, and goals. The video and website can also contain a pledge that residents and businesses can sign. Additional actions would include: door-to-door outreach; support for green teams at schools, faith-based organizations, local businesses and community groups; recycling and composting guides (in print and on the Town website), “oops” tags to instruct residents and business on proper sorting, social media posts, signage depicting materials to be recycled and composted on the lid of carts and bins; and “museum of bad design” displays in local libraries and Town buildings.

3. **Convert to automated collection with wheeled carts** – This initiative would be implemented along with other changes to the collection system to maximize convenience and minimize costs. Automated collection uses cart-based systems to automatically empty collection containers using one-person crews. Instructions for proper recycling and what is not allowed in trash can be embedded onto the carts.

4. **Expand compost collection Town-wide** – Expand compost collection to all generators through implementation of Town-wide food scraps and compostable paper collection. Statewide studies of materials disposed at landfills and incinerators estimate that 33% could have been composted.
5. **Evaluate rate structure incentives** – Evaluate rate structure incentives along with other collection system changes to determine whether standardized containers and fee incentives will reduce waste and increase recycling and compost. This could include volume-based pricing, bin size reductions, or other forms of trash metering.
6. **Evaluate every other week trash collection** - Consider future implementation of every other week trash collection. The approach works in towns with weekly curbside compost collection. Trash volumes are reduced with compost collection so every other week is a potentially feasible, cost-cutting measure. There are over one hundred communities that have embraced this system in the U.S.
7. **Provide reuse collection** – Lexington recently expanded its collection program to include textiles and other household goods. This initiative would evaluate the feasibility of expanding reuse collection for larger bulky items through periodic collection events or on-call programs.

Medium-Term (4-7 Years)

8. **Invest in carbon farming** – Explore opportunities for carbon farming, agricultural methods aimed at sequestering atmospheric carbon into the soil and in crop roots, wood and leaves. Compost from the Town's collection programs can be spread on local public lands, parks and farms to sequester carbon.
9. **Provide market development incentives** - Provide grants to community organizations, non-profits or businesses to address hard-to-recycle or hard-to-compost materials and promote reuse.

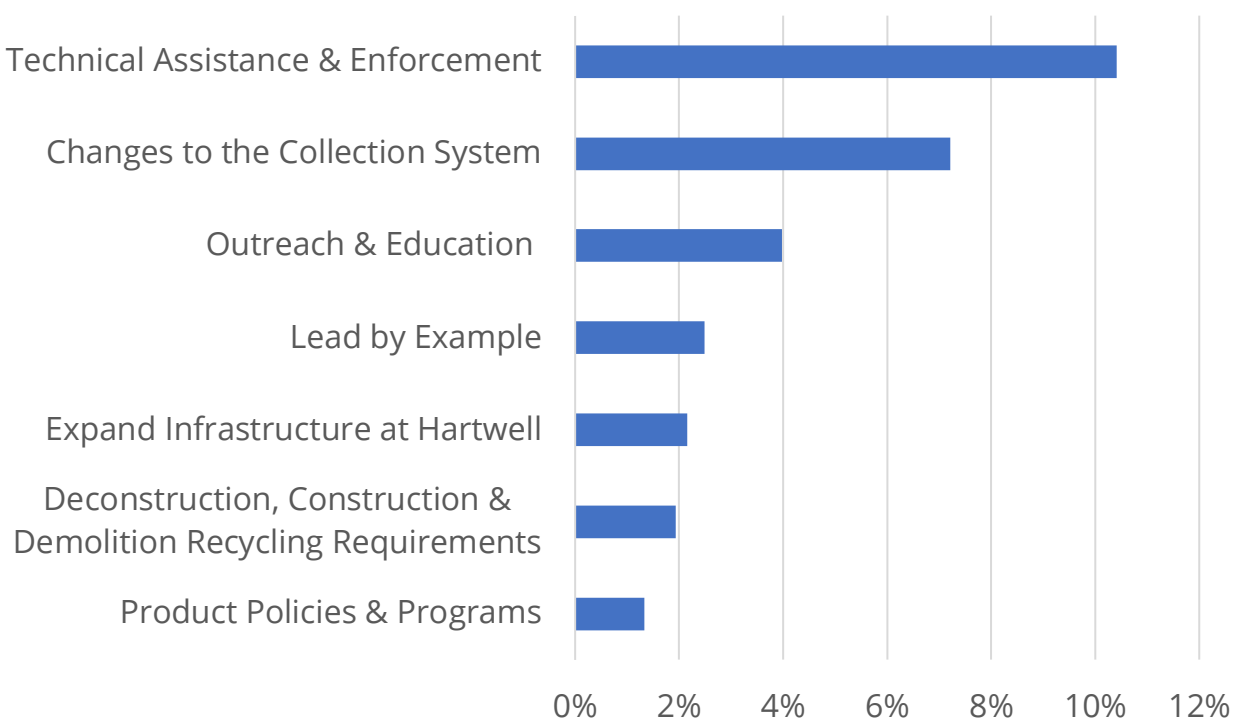
10. **Expand product policies** – Expand on Lexington’s plastic reduction bylaws and consider future policies to reduce the impact of no-recycle, non-compostable, single-use problem products.
11. **Require reusable foodware** – Require or incentivize food service providers to only use reusable food service ware for dine-in or take-out.
12. **Provide school & business assistance** - Conduct trainings, site visits, walk-through audits or assessments, and distribution of displays and signs to increase rates of recycling and/or composting at facilities.
13. **Certify Green Businesses**- Expand on Lexington’s initial research into Green Business Certification to increase the level of participation in recycling and composting programs, provide recognition for successes through a Green Business program or a Zero Waste Businesses or Schools program.
14. **Evaluate food scrap composting** - Develop or contract for local or regional compost processing facilities for yard debris and/or food waste. The Town could consider adding a food scrap composting facility at the existing Hartwell Composting Facility.
15. **Expand recycling/reuse drop-off** – Expand drop-off facility at Hartwell to accept additional materials that are hard to recycle for reuse, refurbishing and/or recycling.
16. **Develop glass processing** – Develop a glass processing center to process and market glass regionally.
17. **Develop education center** – Develop an education center at Hartwell to provide resources, tours and information about how to reduce, reuse, recycle and compost.
18. **Expand building materials reuse** - Develop or contract for reuse centers for sale of salvaged building materials and used household items.

Long Term (8-10 Years)

19. **Adopt deconstruction requirements** - Adopt requirements for deconstruction of buildings slated for demolition or substantial demolition.
20. **Adopt C&D recycling requirements** - Adopt requirements for C&D recycling/reuse in a C&D or Green Building by-law or building permit.
21. **Enact mandatory participation** - Require, through bylaws, proper separation of recyclables from refuse by households and businesses.
22. **Enforce State Bans** - Massachusetts currently bans materials from landfills and incinerators, but does not routinely enforce these bans on individual generators. Adopt a bylaw to enforce the bans of specific recyclable, compostable or toxic materials from entering local transfer stations, landfills, and incinerators.

Impacts

Implementation of the Zero Waste initiatives has the potential to increase Lexington's overall diversion rate from 60% to 90%. Using conservative estimates for capture rates by material type, the short-, medium-, and long-term Zero Waste initiatives would result in an additional 6,672 tons of materials diverted from landfills and incinerators per year through reuse, recycling and composting.



Calculated based on Lexington disposal tons, regional composition data, and estimated capture rates for Zero Waste initiatives

Waste prevention, recycling and composting activities also reduce greenhouse gas emissions. Using the U.S. EPA Waste Reduction Model (WARM), the Zero Waste initiatives to be undertaken in the short-, medium- and long-term are estimated to reduce greenhouse gas emissions by approximately 9,523 metric tons of carbon dioxide equivalent. This will contribute to Lexington's ultimate goal of Net Zero Emissions. The methodology for estimating diversion potential greenhouse gas emissions reduction is included in Appendix C.

Implementation

Implementation of the Zero Waste Initiatives will require the Town to invest in dedicated staff or contractor support, new or extended contracts, and investment in expanded infrastructure. Changes to the programs may result in additional costs or cost savings to Lexington residents and businesses. State and Federal funding opportunities are included in Appendix D.

	Changes to the Collection System	Outreach and Education	Technical Assistance, Reinforcement & Enforcement
Diversion Potential	1,632 tons	898 tons	2,355 tons
GHG Reduction	(1,682) MTCO ₂ e	(1,285) MTCO ₂ e	(3,606) MTCO ₂ e
Staff Support	1,000 hours one-time effort to conduct procurement process and implement Town-wide program. 250 hours annually for contract monitoring and management.	250 hours to develop an Outreach and Education Plan and to assist in implementing it.	100 hours ongoing to help develop technical assistance educational materials, presentations and on-site assessments, if staff have limited background in Zero Waste. If staff are knowledgeable in Zero Waste, there could be more staff time and less consultant time.
Costs	\$50,000 one-time cost for consultant to conduct public workshops, develop Request for Proposals, assist with evaluation and contract negotiation.	\$25,000 one-time cost for consultant to develop the Outreach and Education Plan. Additional \$25,000 per year ongoing cost for implementation of the consultant recommendations	\$10,000 one-time cost for a consultant to help develop and \$50,000 per year ongoing to implement a technical assistance program. This cost could be lower if staff are knowledgeable in Zero Waste and can implement the technical assistance program.

	Lead by Example	Expand Infrastructure at Hartwell	Deconstruction, Construction & Demolition Recycling Requirements	Product Policies
Diversion Potential	562 tons	488 tons	436 tons	301 tons
GHG Reduction	(633) MTCO ₂ e	(627) MTCO ₂ e	(915) MTCO ₂ e	(776) MTCO ₂ e
Staff Support	250 hours to help develop EPP policy, implement it, and to properly enforce the provisions of the policy. Also, to lead Green Team, implementation of Zero Waste Events and to arrange for purchase of containers	1,000 hours one-time effort for design review and construction management.	500 hours to help develop the Bylaw, implement it and other provisions of this initiative, and to properly enforce the provisions of the Bylaw.	500 hours to develop Product Policies, implement them, and to properly enforce the provisions of the adopted Policies.
Costs	\$10,000 one-time cost for containers for Lexington municipal facilities. Additional cost of \$10,000 per year for training and signage materials.	\$2-3 million in one-time costs (design/build) to expand drop-off area and compost operation.	\$50,000 one-time cost for consultant to draft by-law and manage stakeholder engagement process. Note: unredeemed deposits can pay for these costs	\$50,000 one-time cost for consultant to draft by-law, manage stakeholder engagement process, and help with implementation

Appendix A Public input

Lexington Zero Waste survey and interviews

An understanding of resident and business attitudes and activities around Zero Waste and potential future options in Lexington was obtained through two different methods: 1) stakeholder interviews, and 2) an online survey.

The responses from each of these efforts are meant to be informative, not to dictate what should or should not be implemented; the survey is not a statistically accurate sample. Rather, responses are a snapshot of what some people think, highlight where there may be support and opposition to different policies, programs and infrastructure, and identify where education and outreach are needed to inform residents of existing and planned initiatives.

The town's Zero Waste Advisory Committee identified stakeholders to be interviewed. Six stakeholder meetings with seven people were held. These include an individual who had opposed the town's former Pay As You Throw Program, people working in and with schools, business leaders, and a composting company.

Details of stakeholder interviews are below, but two key points from businesses are that finding space for recycling is hard, it would be helpful to have a central place for downtown Lexington retailers to have a central, shared recycling bin. Also, it is hard for small businesses to find the bandwidth to research alternative products, guidance from the Town would be helpful. Expanding compost to include food scraps at the Town's Hartwell site probably isn't practical, but there are alternatives.

With schools, there is much going on, but also opportunities. Green Teams are looking for Zero Waste projects, and students can research and bring policy to Town Meeting. In addition, with the new High School, Zero Waste should be incorporated starting from the design.

A link to an on-line survey was sent to town residents and businesses by members of the town's Zero Waste committee. 524 people responded to multiple choice and open-ended questions. Almost 99% of those that answered are residents, and 3% are businesses (there is some overlap between the two groups). Full survey questions and responses are included below. To summarize some key points:

Respondents for the most part were enthusiastic practitioners of Zero Waste or wanting to learn more.

- Over 43% of respondents felt that Lexington should institute volume-based trash fees (vs. 37% who do not and 29% that said maybe)

- Most people were in favor of product bans (similar to Lexington's existing plastic bag ban).
- Most people said that Lexington should have a policy to require recycling and reuse of construction and demolition materials
- Almost all respondents said that Lexington should have a policy to require reusable, recyclable, or compostable items at street festivals, beer gardens, and other events that require a special permit
- Over half the people responding were fine having less frequent trash collection if food scraps were collected weekly
- The vast majority said the Town could do more to educate residents, businesses, and school children
- There were lots of things residents are already doing to reduce waste, and many ideas for programs the town could implement to reduce waste in schools and public buildings, such as reusable packaging, more material donation opportunities, education, food diversion, competitions, and more.
- There were also many ideas for ways the town can help businesses and residents do more
- The most popular categories of waste that people would like to eliminate, reuse, recycle, or dispose of in a better way include all kinds of plastics, compostable materials, textiles, and electronics. Packaging, toys, and other items also were listed.
- Additional ideas for Zero Waste Programs were suggested, including a giveaway/takeaway area at Hartwell, more repair opportunities, more secondhand stores, a creative reuse center for art supplies, composting at nursing homes, and recycling of construction and demolition materials on site
- Almost 3/4 of respondents would like to see the Town contract with a compost company to collect food scraps.
- Almost ¾ also want to see recycling expanded at Hartwell or other physical space in town. Suggestions include: clothes, electronics household goods, small appliances, and a swap shop. Some people added that they wanted to see Hartwell's hours expanded, others said there should be a more welcoming place than Hartwell for such efforts.
- Over half the respondents said they would like to have more places to buy household goods in bulk, more places to repair things, and a building materials reuse center. Other ideas for infrastructure include a kiln at Hartwell to make biochar from wood waste, a tool and equipment library, and milk dispensers in the schools.

Many people suggested things that there is already access to, such as textile recycling, clothing consignment and furniture donation, buying things in bulk close to home, and cardboard recycling. This could mean that the town could do more to educate people about local zero waste opportunities.

In a number of places throughout the survey people said that they didn't have any faith that their recycling was actually being recycled. Two quotes:

"My main concern is things we put out for recycling are not practical or cost-effective to recycle so end up being incinerated anyway. Recycling programs may actually be counterproductive because they give the false impression that there is a program for reuse when there largely is not."

"I don't believe the town is actually recycling anything in the curbside bins now even though we still separate things. Is this true?"

This points to a potential need for more or better education about what can be recycled or reused, and how, and what happens to recyclables. Having more faith that recyclables were being recycled would likely help boost participation.

Stakeholder Interviews

The town's Zero Waste Advisory Committee identified stakeholders to be interviewed. Six stakeholder meetings with seven people were held. These include an individual who had opposed the town's former Pay As You Throw Program, people working in and with schools, business leaders, and a composting company. Some key takeaways:

Businesses:

- There is not enough space for small businesses in the downtown corridor to recycle—recycling bins central to a group of businesses would be helpful
- Small retail businesses don't have the budget or staff capacity to research Zero Waste options, they need clear direction from the town regarding acceptable alternatives
- A food collection point for composting would be helpful
- Small businesses don't have the power to change how the items they receive are packaged
- There are three main types of businesses downtown—service, merchandise, restaurants. Each type probably has similar waste streams.

Schools

- Learning how to bring policy to town meeting can be a good educational opportunity for students
- Green teams in schools are always looking for more ideas and opportunities to get to Zero Waste
- The town should think about how to incorporate Zero Waste before building the new high school
- There is a lot of good Zero Waste activity already ongoing in schools, including food waste reduction, composting, clothing donations, water filling stations, reuse of surplus materials, electronics refurbishing and recycling, and education about sustainability
- Schools don't have a sense, however, of what the biggest sources of trash they make are. And much of the work is done by volunteers rather than paid staff that would be devoted to sustainability and zero waste.
- There is opportunity to do more, such as a curriculum about composting, Zero Waste lunches

Compost

- Hartwell probably wouldn't make sense as a site to compost food scraps and yard trimmings, since operations would need to be done indoors and the site is not suitable for a building with the capacity to do this

Other feedback

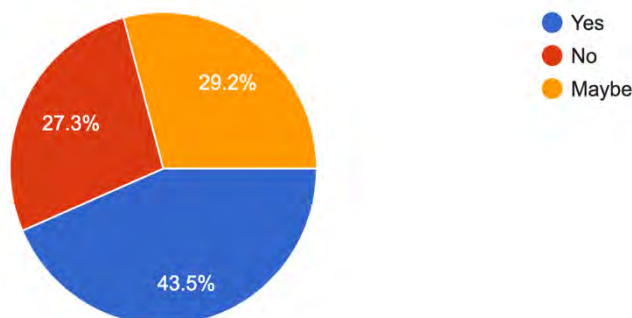
- Food waste collection is a big opportunity
- There are lots of opportunities for transfer or reuse stations in town to lessen the amount of stuff people buy

- No need to expand Hartwell for product exchange, when so much today is on line
- The temporary Quonset hut housing the police could be a better location for reuse than Hartwell
- Extended Producer Responsibility is necessary
- Teardowns of existing buildings is wasteful—some sort of incentive is needed to reduce that
- The town should ask its recycling contractor to show where materials are going for recycling, more transparency is needed
- Zero Waste is important but PAYT isn't the way to get there

Survey Results Summary

A. Policy

1. *Many communities have instituted household trash fees based on the volume of trash disposed by the household as a way to more equitably spread the cost of trash disposal. Do you think Lexington should institute such a program?*

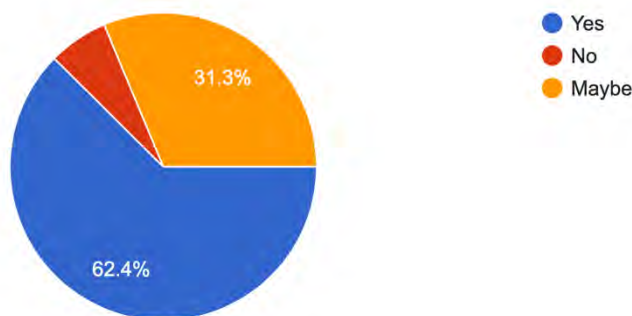


2. *Lexington currently bans the use and distribution of certain types of plastic bags at retail stores. Do you think the town should ban other types of disposable products that can't be easily reused or recycled? If so, what? (371 responses)*

- Most respondents specified they would like to see bans on other types of plastic, such as black plastic, Styrofoam, clamshells, utensils, takeout containers, water bottles, and more.
- Some people suggested bans are better done at the state level.
- Additional responses include first understanding what contributes the most to the waste stream as long as there are better alternatives, and looking at full lifecycle impacts of alternatives.
- About 30 people said no to bans.

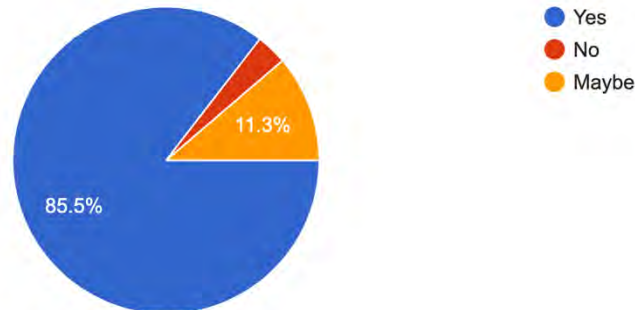
3. *Should Lexington have a policy that requires the recycling and reuse of construction and demolition materials?*

524 responses



4. *Should Lexington have a policy to require reusable, recyclable, or compostable products for food at street festivals, beer gardens, and other special events that require a town permit?*

524 responses



5. *Do you have any other thoughts on these or other Zero Waste policies for Lexington that you'd like to share?*

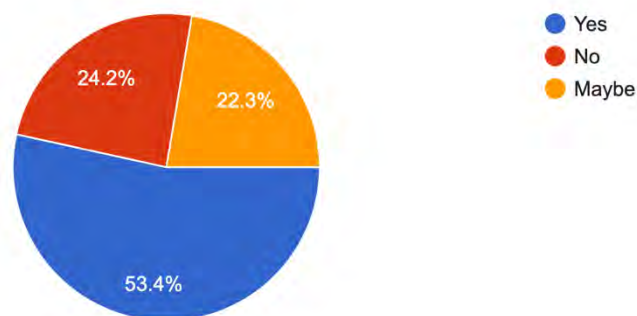
- institute town wide composting of food scraps (about ¼ of respondents mentioned this in some form)
- provide information for people who are downsizing to find outlets for their household items
- have a central reuse site
- create incentives for waste reduction
- provide bins for organics around town
- set up water bottle filling stations
- enforce existing policies
- have town sponsored Terracycle bins
- provide more opportunities to buy in bulk
- do more education
- support Extended Producer Responsibility
- hold special recycling days for difficult to recycle materials
- put in place more incentives/support for reusables
- don't institute Pay as You Throw, provide trash containers smaller than 64 gallons in size, or add compost to the tax burden
- provide more options at Hartwell for reuse and recycling
- limit home teardowns
- have more pickup dates for yard waste
- put in place a "skip the stuff" policy, where utensils, etc. for takeout are only provided upon request
- reduce single use plastics in schools
- hold a town wide flea market
- clean up litter, it makes people think the town isn't serious about properly taking care of waste

- education, enforcement, and well thought out policy that won't harm businesses are key
- start with voluntary programs
- get rid of single stream
- make sure anything done is affordable and that fees are equitable

B. Programs

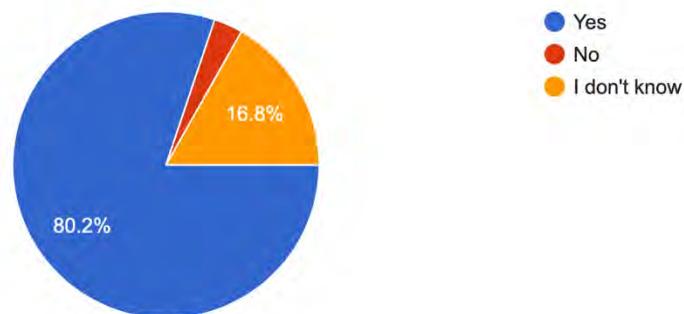
6. *Would you be willing to have trash collected less frequently if there was weekly collection of household food scraps provided by the Town?*

524 responses



7. *Should Lexington do more to educate school children, businesses and residents about Zero Waste opportunities?*

524 responses



8. *If you answered Yes above, please describe what would be helpful (277 responses):*

- step up public outreach
- create brochures and videos
- do more mailings and emails
- use more volunteers to educate school children
- use fewer volunteers and create paid positions to do zero waste education,
- add zero waste to the school curriculum
- place articles in local papers
- work through community organizations

- hold programs through the schools to educate parents
- look to successful education programs in other communities
- hold information sessions and demonstrations at libraries and events
- take school children on field trips to waste facilities
- teach ecology starting in kindergarten
- educate residents about the high quality of Lexington's water to reduce single use water bottles
- make the connection between zero waste and carbon footprint
- put more signage everywhere
- focus on not making trash
- look at the environmental and financial costs of waste
- perform waste audits in schools, and include students
- educate school custodians and staff
- counteract misinformation about recycling
- tell people how to reduce waste
- provide a flier with the tax bill
- start an audit/certification program for green businesses, including window decals
- collaborate with arts organizations for messaging/branding/engagement
- hold school assemblies on waste and other environmental topics
- provide information about the benefits of recycling,
- create a Green Team focused on residents and businesses
- show documentaries at the library
- support art projects (like the black plastic one at the Munroe Center)
- have a staffed booth at Discovery Day and other town events
- put reminders on recycling bins
- provide signage for businesses to put up in their workplaces
- involve science coordinators
- send out automated email recycling/trash collection reminders
- be repetitive
- provide lawn signs
- let people know about Zero Waste businesses in town
- create gamification or other interactive learning tools
- send out reverse 911 calls
- don't pick up trash/recycling that doesn't comply with rules
- put compost bins next to every trash can downtown
- show positive examples from other countries
- explain impacts of landfilling, incineration, and consumption
- use social marketing techniques
- send out monthly zero waste tips

9. *Do you have thoughts about programs that the town of Lexington can put in place to reduce waste generated in schools and government offices? (199 responses)*

- reusable packaging containers for deliveries
- allow donation of unopened food from school cafeterias
- do double sided copying
- go paperless
- install dishwashers
- teach parents about packing Zero Waste lunches
- don't use K-cups
- have more water filling stations
- get rid of vending machines
- hold Zero Waste competitions in schools
- compost in all buildings and tie composting to the science curriculum
- reduce food service packaging
- don't use trays and do use reusable plates and silverware
- give fewer plastic toy rewards to school kids
- purchase environmentally preferable products
- serve food from school gardens in cafeterias
- do a school food waste challenge, measuring the amount of wasted food at the beginning of week, doing education, and measuring again at end
- work with Whitsons to reduce packaging
- don't require kids to take food they won't eat
- use refillable cleaning products
- provide signage about how much waste is generated
- go digital first for bills, etc.
- pay staff and reduce dependence on volunteers
- make surplus furniture and supplies available to the public
- have a sustainability leader in each school

10. *Are there programs that the Town could enact that would help businesses and residents reduce and divert more materials from disposal (the top 4 answers were provided as options, with "other" for ideas to be added by respondents) (472 responses)*

- add small businesses to curbside recycling collection (381 responses, 81.4%)
- host an on-line platform for materials exchange (336 responses, 71.2%)
- host repair fairs (250 responses, 53%)
- add more materials to curbside recycling (286 responses, 60.6%)

additional suggestions:

- a drop off location for cardboard and glass
- provide more services to apartment complexes
- town wide compost pickup
- recycle equipment and electronics such as printers, computers, and household gadgets
- provide educational programs about Green Living

- host recycling days for materials not in regular curbside
- on-line platform for materials exchange
- more recycling and compost bins in public places
- furniture drop off or pickup
- make more drop-off locations available
- allow commingling of cardboard and paper curbside
- reusable household goods collection
- host repair fairs
- town wide curbside composting
- refuse mass junk mail
- put stickers on reusable items left at curb to let people know where to donate
- provide a way for people to buy laundry detergent in bulk
- extend yard waste collection dates
- host repair fairs
- teach residents how to upcycle and reuse
- provide water refill stations
- make reuse chic
- set aside space at Hartwell for exchange of toys, household items, etc. (see transfer stations/drop offs in Wayland, Arlington, and Nantucket as examples for swapping activity)
- town wide yard sales (Arlington does)
- let markets determine what should be collected
- ban plastic bottled water
- create rules to discourage businesses from throwing out food, including donation
- charge for trash over a minimum set by town
- clarify what can and can't be recycled
- actually, recycle what goes in bins
- mandate paper and plastic recycling
- require businesses, when renewing permits, to be more eco-friendly
- use compostable-ware and have receptacles at stores in town center
- minimize junk mail advertising
- make info on town website about on-line exchange programs more accessible
- is there an alternative for disposing of kitty litter?
- do more to support the repair shop in town center
- add Terracycle materials
- town "Trash to Treasure" day where residents can put items on curb for others to scavenge
- waste audits and demonstrations
- go back to source separated recycling (vs single stream)
- discounted Soda Streams in place of seltzer cans and bottles

- K-cup and crayon recycling
- put redeemed bottle deposits towards real estate taxes
- art supply station for random things
- large bin for household goods that can be reused by non-profits
- a table at the farmers market for free things
- a way for homeowners to recycle or get rid of home renovation materials (even for a small fee)
- make it easier for residents to recycle furniture and other large items that someone can use
- partner with big zero waste initiatives for reuse and repurpose, such as the Lynn bottle caps into park benches program
- promote existing on-line platforms, like Freecycle
- engage the community in efforts that shift mindset from “throw-away culture” to “repair and love/use longer”
- flea market at the dump
- partner with UTEC or similar entity for mattress recycling

11. *Are there waste items that you frequently generate that you wish you could eliminate, reuse, recycle, or dispose of in a better way that the town could help develop programs for? If so, please describe (296 responses):*

- Plastics including bags, zip lock bags, tubes, #5 plastics, laundry jugs, pill bottles, plastic nursery pots, Styrofoam of all kinds, black plastic, takeout utensils, clamshells, bubble wrap, takeout containers
- Other items: cassette tapes, milk cartons and aseptic containers, batteries, light bulbs, clothing, lined cardboard, books, bricks, junk mail, cardboard boxes, kitty litter, chip bags, contact lenses, bulky items, delivery packaging, diapers, paint, glass, home construction materials, sports equipment, freezer packs, invasive weeds that shouldn't go in compost, junk mail, things needing repair, kids' art supplies, old journals and magazines, furniture, pizza boxes, broken ceramics, coffee bags, aluminum foil, toys, and shredded paper

12. *Please share any other thoughts you have about potential Zero Waste program opportunities for Lexington (89 responses)*

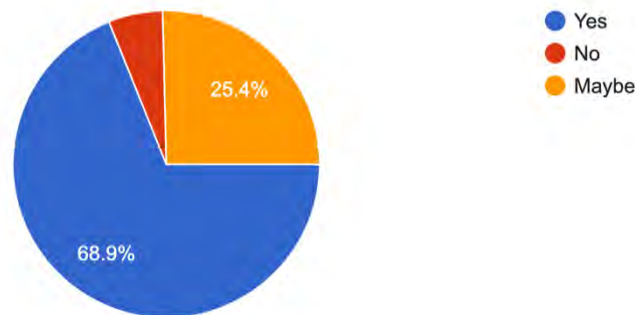
- have a giveaway/takeaway area at Hartwell
- more repair- expand the senior center fixit program and teach repair in schools
- an app where you can upload a photo and it will tell you what to do with that item
- more secondhand stores for a wider variety of items
- encourage residents to advocate for state policies (e.g., bottle bill, EPR)
- look at Arlington as a model for outreach
- creative reuse centers for arts materials

- offer free composting services to nursing homes
- less frequent trash pickups may make it harder for seniors to lift bags
- make builders recycle more on site
- put more emphasis on Zero Waste strategies in the next hauling contracts
- structure costs to be at least property tax burden neutral
- provide information for new residents
- have periodic curbside scrap metal pickups

C. Infrastructure

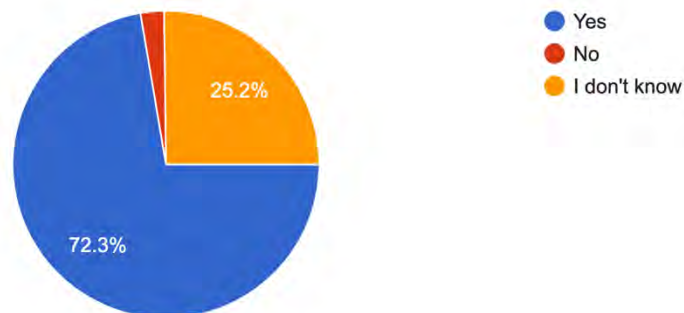
13. *Do you think Lexington should contract with a company to run a curbside food scrap composting program?*

524 responses



14. *Do you think the town should expand opportunities for reusable product exchange at the Hartwell recycling center or other physical space?*

524 responses



15. *If you answered yes above, please Include examples, like clothes, electronics, household goods, small appliances, etc. (300 responses)*

- clothes
- electronics
- household goods
- small appliances

- swap shop for anything that can be repurposed/reused (building materials, sports equipment, furniture, toys/games, art supplies, gardening tools, children's items, clothing, pet accessories, etc.)
- expand Hartwell hours
- have a webcam or electronic list so people know what's there
- find a more welcoming place than Hartwell
- examples of other sites to learn from include Wellesley and Nantucket
- partner with non-profits that can take collect materials at the site

16. *What types of commercial businesses do you think could be located in town that would help you with Zero Waste practices? (The first three options were provided, with an "other" category for suggestions) (524 responses).*

- more bulk buying and refilling (291 responses, 55.5%)
- more places to repair things (294 responses, 56%),
- building materials reuse center (297 responses, 56.7%).

Other suggestions:

- more used clothing stores
- places where parents can get used school items for their children
- takeout container reuse
- a list of vetted repair contractors
- more zero waste options in existing stores
- art depot and workspace for reusable materials
- rental for household goods and tools
- use empty storefronts for pop-up repair centers
- a used bookstore
- a place to donate workable used appliances

17. *Do you have any other thoughts about infrastructure that could help Lexington achieve Zero Waste goals? (88 responses)*

- a kiln at Hartwell to make biochar from wood waste
- a party store reuse hub for schools, PTA's, sports boosters
- more containers for groups like Planet Aid
- composting
- dispensing machines for milk and other items in grocery stores
- permission to dig up plantings when tear-downs will pave them over
- home trash audits
- examine yard care practices to reduce waste
- tax benefits for reuse businesses
- Black Earth Compost
- make a list of reuse businesses
- change zoning to encourage additions over tear downs
- a town sponsored place to leave usable items

- ensure citizens and businesses are informed about options, such as Rescuing Leftover Food, FoodLink
- a lawn equipment rental center
- cheaper commercial rents are needed
- tax new home developments to fund a building material reuse center

D. Other

18. *Do you have other thoughts about how Lexington can help residents and businesses reach Zero Waste? (137 responses)*

- normalize dumpster diving
- work regionally
- ban plastic water bottles
- celebrate businesses that do well
- charge more for waste disposal
- lead by example
- encourage residents to support EPR
- do more education
- expand the Everything Free Lexington Facebook page
- give people a reason to care about Zero Waste
- hold Zero Waste household and business awards
- a town giveaway day to leave things at the curb
- bring back dual stream recycling
- nudge people, don't mandate
- have one town website with all zero waste resources
- host a town environment day
- include water and energy when thinking about waste
- work with the Board of Health so people can bring their own containers to cafes and restaurants
- do a sector-based analysis of what is in our trash
- have a "sharable" website for equipment, large amounts of plates, etc.

E. Please tell us a little about you

19. *Are you a Lexington resident and/or do you have a business in town?*

- Resident (518 responses, 98.9%)
- Business (16 responses 3/1%)

20. *Which of the following Lexington waste diversion programs have you participated in in the past year-- check all that apply (first 9 options were provided, plus "other"). (524 responses)*

- Curbside recycling (472, 90/1%)
- Donate or sell materials (clothing, building materials, bicycles, books, etc.) to organizations (471 responses, 89.9%)
- Drop off yard waste for composting (271 responses, 51.7%)

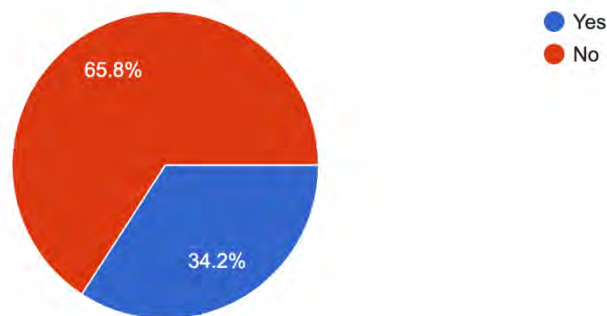
- Household hazardous waste (289 responses, 55.2%)
- Medical waste (176 responses, 33.6%)
- Paper shredding (123 response, 23.5%)
- Textile drop off (278 responses, 53.1%)
- Metal recycling (138 responses, 26.3%)
- Drop off plastic bags at supermarket (302 responses, 57.6%)

Other waste diversion activities people participate in:

- Black Earth composting
- backyard composting
- wine cork recycling-- at Whole Foods and donate to artists
- Lex Reuse it
- give away items to charities
- take Styrofoam to another town to recycle
- cardboard drop off at Hartwell
- purchase rain barrel
- exchange on Lexington Marketplace
- pick up compost at Hartwell
- purchase clothes at thrift store
- sneaker recycling
- ink-jet recycling
- recycle Brita filters at Whole Foods
- return spent batteries to stores (at a cost)
- ship aseptic packaging to contractor (for a cost)
- share items with neighbors)
- shop at Center Goods
- reuse plastic bags for dog poop
- collect and divert markers, plastic bags, batteries, cellphones, light bulbs in schools
- Terracycle
- buy from consignment stores
- use little free library
- food pantry drop off of paper bag
- return bottles for deposits
- Freecycle
- participate in Everything Free Lexington
- repurpose vintage fabric and sell the clothing items
- bring own bags to stores

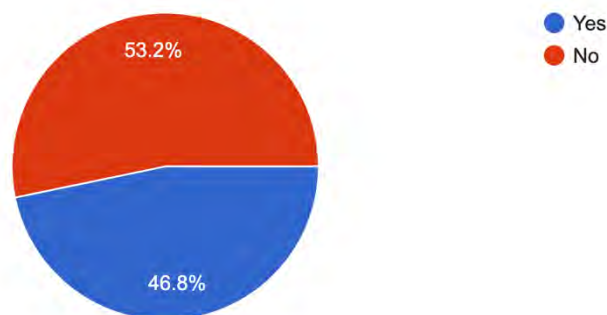
21. *Do you compost in your backyard?*

524 responses



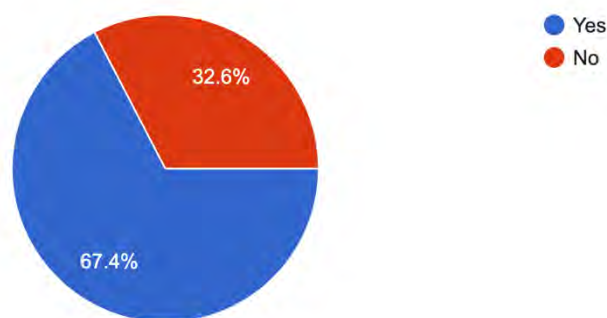
22. *Do you compost food scraps using a home pickup service?*

524 responses



23. *Do you buy items (food, household cleaners, etc.) in bulk or refill items in your own containers when you can?*

524 responses



24. *Do you try and avoid single use plastic items? If so, describe. (327 responses)*

- bring my own containers to the grocery store
- avoid take out beverages
- all the time!
- almost impossible, but I try
- buy loose vegetables and fruit

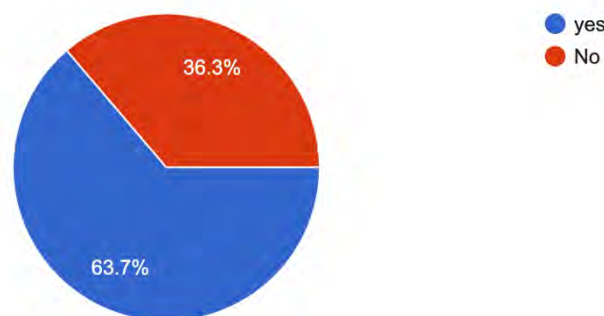
- reusable water bottles
- reusable grocery bags
- reuse takeout food containers
- use reusable zip lock bags
- refuse straws
- avoid single-use cups and containers if a business/restaurant allows it
- bar soap, shampoos, etc.
- powder detergent for dishes and clothes
- make homemade yoghurt
- buy milk in glass
- buy in bulk
- buy larger size or minimalist packaging
- buy cosmetics without plastic
- make own skincare supplies
- use reusable containers
- bring reusable utensils everywhere
- compostable zip top bags
- compostable parchment paper
- bring own containers for takeout where allowed
- Soda Stream
- compostable paper products
- compostable floss
- difficult, but I try
- don't use throwaway dishware
- don't use plastic bags for veggies at supermarket
- don't get takeout from restaurants that use single use plastic
- donate takeout utensils to foodbank
- hard to avoid at Brookhaven, many things are in plastic for sanitary code reasons
- how can you do that?
- ask takeout restaurants to skip plastic/Styrofoam container and utensils
- grow and can own garden produce
- have milk delivered in glass bottles or buy at stores that have it in glass
- wash zip lock bags and reuse
- patronize restaurants that serve food on washable or compostable dishes
- carry own durable items: coffee mug, water bottles, bowls
- ask restaurants not to include cutlery/packaged condiments for takeout
- laundry sheets packaged in cardboard envelope
- get less takeout due to plastics
- look for items without plastic packaging
- make reusable shopping bags from grain bags and give to vendors to give away at Waltham farmers market.
- reusable sacks for produce

- reuse plastic packaging as much as possible
- avoid Whole Foods because of excess packaging
- try and buy from stores/restaurants that use compostable containers or recyclable plastic
- use glass containers when possible
- reuse plastic bags for dog poop or recycle at store
- use paper plates, compostable cutlery, paper straws, paper cups
- use Persia laundry detergent in 130 wash size in a cardboard box
- use tooth tabs for toothpaste
- use deodorant in a jar
- make DIY cleaning supplies (e.g., vinegar and baking soda)
- pledged never to use straws ever again
- shop less at Wilson Farms because of plastic containers
- wash my plastic spoons and reuse
- bring reusable bowls to the office for parties
- sometimes there is no choice
- it's difficult, being single, older, and wanting prepared foods once in a while
- I've succumbed to the convenience of individual packing for kids snacks
- try to buy drinks in aluminum cans
- try to avoid most of the time
- rarely get takeout
- don't try and avoid it
- I don't avoid it but would like tips on how to do so
- do all home cooking from scratch
- ask nurseries not to wrap plants or flowers in plastic
- tried using wax fabric wraps at home, didn't like them
- refuse, reuse, recycle
- get supplies at Center Goods
- trying to get Zero ToGo pilot going
- use any thick plastic bags I get to line waste baskets
- sometimes
- will do more
- switched from plastic bottle seltzer to aluminum can
- use NEXT compostable coffee pods
- try and buy meat and produce in non-plastic containers
- try and remember to bring my own containers for leftovers at restaurants
- trying to
- make own nut butters
- reuse containers
- if plastics were not an option, it would be easier to change my behavior!
- we try, but there's not a good option for takeout food
- use "real" or compostable ware for outdoor use and entertaining
- try and use compostables if need single use

- bamboo straws
- wash and reuse any plastics we do use
- use silicone or compostable plastic bags
- would love to refill items in my own container but I don't know where
- yes
- yes, but it's hard
- yes, but I'm inconsistent
- yes, when possible
- yes, but unfortunately it means I don't support local restaurants to the degree I would otherwise
- buying more in bulk and trying to buy paper or aluminum packaging
- use silicone lids and glass containers with lids as much as possible
- buy wholesale jugs of hand soap and refill a smaller bottle
- avoid individually wrapped snacks
- never use zip lock bags, saran wrap, or straws
- don't buy disposable pens or pencils
- buy concentrated, solid (not liquid) cleaning products
- got rid of plastic bags in our lunches
- we love when restaurants let us bring our own containers, please encourage health department to remove concerns
- I love Center Goods, they should get town funds
- buy frozen concentrates for drinks and use pitchers
- buy cookies in boxes or bags that don't have plastic inside
- I write regularly to Whole Foods and Trader Joes about improving their packaging
- I do a lot of little things and yet I still find myself drowning in unavoidable plastic

25. *Do you buy used items when you can?*

524 responses



26. *Are there any other Zero Waste practices you participate in? (181 responses)*

- collect items for food pantries, including paper bags
- donate regularly through BBBS or Household Goods in Acton

- all Terracycle programs
- would like to compost at retirement community but can't
- avoid choosing more of anything than you actually need
- use things up, don't replace unless and until necessary
- good maintenance practices in all areas: car, clothing, kitchen
- grow my own vegetables and herbs
- avoid soda
- bring returnable bottles and cans to stores
- borrow and lend appliances from/to neighbors and friends
- trying to get schools to donate excess food
- buy largest size (knowing I would waste the contents) of snacks, etc.
- Buy Nothing, Lexington Mavens, FreeCycle, Lexington ReUsit, etc. groups- to get rid of and find things
- buy less
- mend clothes
- reupholster furniture
- clothing swaps with friends
- try not to waste food
- decrease consumption
- donate used items
- use reusables vs disposables
- eliminated paper products in kitchen
- use kitchen garbage disposal for food scraps
- buy imperfect food
- feed food scraps to backyard chickens
- use 100% reused padded mailers from friends/community members for shipping business orders
- reuse nursery plant pots
- get wood chip mulch from local tree service
- make own compost
- buy refurbished electronics and appliances
- use compostable sponges and bamboo paper towels
- use cotton wipes instead of paper towels
- buy experiences or meals for family members instead of physical gifts
- no mow lawn
- use the library instead of buying books
- use graywater
- make many things from recycled and reused materials, repurpose old clothing
- reuse textiles in my art practice
- buy secondhand
- trying to get my boyfriend to recycle
- it's not a social norm yet, I need to be forced into it

- support EPR legislation
- refuse a plastic lid on my coffee
- repair and repurpose as much as I can
- pick up trash in my neighborhood
- hold an annual yard sale
- buy tea in bulk and not individual bags
- recycle
- freeze things in glass
- use reusable fabric covers on food to avoid plastic and aluminum
- avoid bags where I can and use the ones I get for trash
- I wish there were
- I'm on a mission to normalize garment mending and promote a culture of community around reuse and repair
- lending and borrowing
- mail back used ink cartridges
- get and pay e-bills
- add lint or ashes to compost
- we didn't tear down our small house
- no gifts exchanged at birthday parties for our kids
- read books and newspapers online
- recycled materials from my own construction project
- support organizations working to reduce waste
- swap gardening tools and plants
- Little Free Libraries
- try to use things until they break
- conserve water and energy
- avoid non-compostable packaging
- pick up salvageable furniture from curb to rehab and use or sell
- take salvageable things at curb to GoodWill
- use leftovers
- menstrual cups
- refillable whip cream containers that use cartridges

Appendix B Regional and National Examples

1. **Expand Environmentally Preferable Purchasing** – Expand on Lexington’s initial research into environmental preferable purchasing for all Town departments using the model developed by the Massachusetts Operational Services Division.

- [Massachusetts Environmentally Preferable Purchasing Program](#)
This program establishes specifications for sustainable products on statewide contracts, fosters cost effective responsible purchasing choices that help reduce impacts on public health and the environment, and works with agencies, departments and others to encourage their use in public operations.

2. **Expand outreach & education** – Expand outreach and education efforts to assist all generators (residential, commercial, institutional) to reduce, reuse, recycle and compost. This initiative includes a number of components to enhance the Town’s current recycling and organics programs to ensure that all residents and businesses have the information and tools to reduce, reuse, recycle and compost correctly.

In order to change people’s behavior, they need to be contacted 7-15 times from different sources to reinforce the message and detail the behavior desired. An initial education video can explain Zero Waste and refer viewers to an informative website laying out the Zero Waste Plan, bylaws, timeline, and goals. The video and website can also contain a pledge that residents and businesses can sign.

- Missoula, MT
[“What Do I Do With...?” section of zerobyfiftymissoula.com](#) provides contact information for local businesses that provide reuse and recycling options for 25 categories of materials.
- Vancouver, WA
The City implemented a [Zero Waste Challenge Social Marketing Campaign](#) targeting residential behavior change

- **Redmond, WA**

The City's [Refresh Your Recycling Program](#) uses community-based social marketing principles to expand business recycling activity; since the program was established, over 200 businesses have received assistance, resulting in an estimated additional recycling of over 3,000 cubic yards

3. **Convert to automated collection with wheeled carts** – This initiative would be implemented along with other changes to the collection system to maximize convenience and minimize costs. Automated collection uses cart-based systems to automatically empty collection containers using one-person crews. Instructions for proper recycling and what is not allowed in trash can be embedded onto the carts.

- [Florence, AL and Columbia, SC \(PDF\)](#)

In 2015, the cities of Florence and Columbia switched from 18-gallon recycling bins to recycling carts, funded in part by grants from the Recycling Partnership; the shift from bins to carts is expected to increase the amount of recyclables collected by approximately 1,400 tons per year in Florence and 6,500 tons per year in Columbia

4. **Expand compost collection Town-wide** – Expand compost collection to all generators through implementation of Town-wide food scraps and compostable paper collection. Statewide studies of materials disposed at landfills and incinerators estimate that 33% could have been composted.

- **Hamilton, MA**

The Town implemented a residential curbside organics collection program, which, in addition to switching to every-other-week trash collection, has reduced the Town's solid waste tonnage by over 30%

[Case Study: Hamilton and Wenham Massachusetts Curbside Composting Program \(PDF\)](#)

- [Cambridge, MA](#)

In April 2014, the City began a pilot program to expand curbside collection services to food waste; after one year, over 600 households participated in the pilot program and more than

170,000 pounds of food scraps were collected. In its first full year citywide, 1800 tons of food scraps were diverted, reducing citywide trash by 8%. In greenhouse gas emissions, this is the equivalent of not driving 2.7 million miles. The program has been citywide for many years.

5. **Evaluate rate structure incentives** – Evaluate rate structure incentives along with other collection system changes to determine whether standardized containers and fee incentives will reduce waste and increase recycling and compost. This could include volume-based pricing, bin size reductions, or other forms of trash metering.

- [Fort Collins, CO](#)

The City requires private haulers to provide curbside recycling to residents at no extra charge, apply volume-based pricing, and offer a range of trash can size options; the ordinance further requires that the charge for additional containers of the same volume capacity be no less than the charge for the first container

- [Castro Valley, CA](#)

The Sanitation District established volume-based rates for trash service, embedding the cost of recycling into [trash service rates](#) for businesses and multi-family properties that subscribe to no more than 3 cubic yards of trash service per week; 85% of commercial properties subscribe to 3-yard trash bins or smaller

- [Gainesville, FL](#)

In establishing variable rates for residential solid waste collection that assessed higher monthly rates for use of larger garbage containers, the City achieved an 18% reduction in the amount of solid waste collected, resulting in a savings of \$7.95 per home

[PAYT Success Story: Gainesville, FL](#)

6. **Evaluate every other week trash collection** - Consider future implementation of every other week trash collection. The approach works in towns with weekly curbside compost collection. Trash volumes are reduced with compost collection so every other week is a potentially feasible, cost-

cutting measure. There are over one hundred communities that have embraced this system in the U.S.

- [Vancouver, WA](#) Rates for contracted commercial garbage collection service are lower for every-other week service for each container size option, with a once-per-month collection option for 32-gallon cart service offered at a rate less than half that of weekly collection; commercial customers are allowed up to two 96-gallon recycling carts for no additional charge.
- [Portland, OR](#) Residential garbage pick-up every-other-week, with options to decrease the frequency of garbage service, along with weekly collection of recyclables and organics in 60-gallon carts; the switch to every-other-week trash collection led to a 35% reduction in the amount of garbage collected and tripled the amount of organics collected.

7. **Provide reuse collection** – Lexington recently expanded its collection program to include textiles and other household goods. This initiative would evaluate the feasibility of expanding reuse collection for larger bulky items through periodic collection events or on-call programs.

8. **Invest in Carbon farming** – Explore opportunities for carbon farming, agricultural methods aimed at sequestering atmospheric carbon into the soil and in crop roots, wood and leaves.

- San Francisco, CA
San Francisco has partnered with [Zero Foodprint](#) to purchase finished compost for distribution to farmers and ranchers who will apply compost to their acreage and sequester carbon.

9. **Provide market development incentives** - Provide grants to community organizations, non-profits or businesses to address hard-to-recycle or hard-to-compost materials and promote reuse.

- [District of Columbia Department of Energy and Environment](#)
Their Donation and Reuse Award Program provides funding for donation and reuse projects, programs, and services for increased donation and reuse opportunities of materials otherwise headed to the waste stream in the District. The awards may also fund education and engagement efforts to increase the public's understanding of the importance of donation and reuse and increase awareness of current donation and reuse opportunities and best practices. Up to \$15,000 is awarded to nonprofit organizations, faith-based organizations, government agencies, universities/educational institutions, or private enterprises.
- [StopWaste, Alameda County, California](#)
StopWaste offers a Reuse and Repair Grant Fund for innovative projects that incorporate reuse, repair, deconstruction, product or process redesign, reduction, recovery, and redistribution of goods, and other materials. The goal is to minimize the need for wasting or recycling, and instead foster waste reduction to support environmental sustainability and conservation of natural resources, and stimulate economic activity in the reuse and recovery sectors. Grants of up to \$20,000 are available to nonprofit and for-profit organizations.

10. **Expand product policies** – Expand on Lexington's plastic reduction bylaws and consider future policies to reduce the impact of no-recycle, non-compostable, single-use problem products.

- [Concord, MA](#)
The Town banned the sale of drinking water in single-serving PET bottles beginning in January 2013
- [Minneapolis, MN](#)
The City's [Environmentally Acceptable Packaging Ordinance](#) adopted in 2015 requires food establishments to use only reusable, recyclable and/or compostable packaging of food and beverages for dine-in or take-out, as well as provide recycling and/or composting bins. The City's health and food inspectors actively

check for prohibited packaging that does not meet the ordinance requirements

- [San Francisco, CA](#)

Effective July 2017, the City adopted an ordinance that expands its ban on polystyrene foam food service ware to include packing materials, coolers, ice chests, pool and beach toys, dock floats and mooring buoys, egg cartons, and trays used in meat and fish packaging made in whole or in part of polystyrene foam

11. **Require reusable foodware** – Require or incentivize food service providers to only use reusable food service ware for dine-in or take-out.

- [Palm Springs, CA](#)

Food vendors must use reusable items (metal, ceramic, glass, plastic) for on-site dining. Condiments for on-site food consumption must be provided in reusable containers or bulk dispensers. Individual single-use plastic condiment packages are prohibited for on-site use.

- **Oakland, San Francisco, San Jose, Sunnyvale, South San Francisco, San Mateo County, CA**

The cities and County participated in a [ReThink Disposable Packaging Waste Source Reduction Pilot](#) led by a non-profit organization, Clean Water Action, to engage local restaurants in reducing single-use disposable products and packaging. ReThink Disposable will be expanding from California to other states next year, including Massachusetts.

12. **Provide school & business assistance** - Conduct trainings, site visits, walk-through audits or assessments, and distribution of displays and signs to increase rates of recycling and/or composting at facilities.

- [Eco-Cycle](#) in Boulder, CO

Eco-Cycle developed educational material on [recycling, composting and reuse](#). They also have a [School Recycling and Environmental Education program](#) for Boulder and Broomfield counties schools.

Eco-Cycle has created a [10-part Zero Waste video series](#), a video featuring Captain Zero Waste, a video on recycling at Boulder County Recycling Center featuring Mr. Can and all of those videos come with downloaded activities.

- **Kirkland, WA**
The City provides on-site recycling technical assistance, deskside recycling containers, and outreach materials to businesses
[Kirkland's Recycle](#)
- **Montgomery County, MD**
The County's [Smart Organizations Reduce and Recycle Tons \(SORRT\) Program](#) offers a range of educational materials as well as on-site technical assistance to businesses to help them comply with the County's mandatory recycling requirements

13. **Certify Green Businesses** - Expand on Lexington's initial research into Green Business Certification to increase the level of participation in recycling and composting programs, provide recognition for successes through a Green Business program or a Zero Waste Businesses or Schools program.

- **Mecklenburg County, NC**
The County's [Wipe Out Waste Recycling Ambassador Program](#) offers recognition to businesses that reduce, reuse, and recycle waste in the workplace and purchase recycled products
- **Tompkins County, NY**
The County's [ReBusiness Partners Program](#) provides public recognition to local businesses that have a recycling program to effectively collect all mandatory recyclables and demonstrate activities in the areas of reduce, reuse, or rebuy

14. **Evaluate food scrap composting** - Develop or contract for local or regional compost processing facilities for yard debris and/or food waste. The Town could consider adding a food scrap composting facility at the existing Hartwell Composting Facility.

- **Prince George's County, MD**

In 2013, the County began a food waste composting pilot at its [yard waste composting facility](#), processing food waste commingled with mulch and yard trimmings in covered, positively aerated heaps [Food Scraps Composting at County Yard Trimmings Site](#), BioCycle, May 2015

- **Onondaga County, NY**

The [Onondaga County Resource Recovery Agency](#) has been composting food waste since 2007 at its Amboy Compost Facility and in 2015 processed over 3,000 tons of commercial and institutional food waste [2015 Annual Report on Recyclables Recovered \(PDF\)](#), OCRRA

15. **Expand recycling/reuse drop-off** – Expand drop-off facility at Hartwell to accept additional materials that are hard to recycle for reuse, refurbishing and/or recycling.

- **Boulder County, CO**

The County developed a [Center for Hard to Recycle Materials \(CHaRM\)](#) to collect materials dropped off by the public that are not cost-effective to collect via curbside services

- **El Cerrito, CA**

The City's [Recycling and Environmental Services Center](#) accepts hard-to-recycle items, such as polystyrene foam, bubble wrap packaging, automobile batteries, used motor oil, pharmaceuticals and carpet, as well as electronic waste, plastic film, and scrap metal; the City also accepts at the Center donations of reusable household materials and textiles which are collected by local non-profit organizations for re-sale

16. **Develop glass processing** – Develop a glass processing center to process and market glass regionally.

- [Northeast Resource Recovery Association \(NRRRA\)](#)

NRRRA partnered with the Town of Dennis, MA to help Cape Cod communities recycle their glass locally. Six Cape Cod communities participate in NRRRA's processed glass aggregate program, where glass

bottles and jars get crushed into an aggregate to be used locally in infrastructure projects. NRRA's vendor recently completed a crush of glass in Dennis, MA, and the crushed glass will be used in local projects.

17. **Develop education center** – Develop an education center at Hartwell to provide resources, tours and information about how to reduce, reuse, recycle and compost.

- RethinkWaste, San Mateo County, CA
RethinkWaste operates the [Shore Environmental Center](#) which includes interactive exhibits and hosts tours of the processing operations.

18. **Expand building materials reuse** - Develop or contract for reuse centers for sale of salvaged building materials and used household items.

- **Tompkins County, NY**
The County made a commitment to develop a Reuse Center as part of its 20-year solid waste management plan; [Finger Lakes Reuse](#), a non-profit run community reuse warehouse, is an outgrowth of this vision
- **New Paltz, NY**
Through its Zero Waste initiative, the Town established a [Reuse Center](#) that accepts donations of craft supplies and building materials in usable condition for re-sale; the Town promotes de-construction and provides volunteer opportunities for residents
- **Missoula, MT**
[Home Resource](#), a non-profit building materials reuse center, collects and sells reusable surplus building materials
- **Westmoreland County, PA**
[American Architectural Salvage](#) is operated by a non-profit agency that accepts donations of building materials and supplies for resale and reuse
- **Chicago, IL**
The [ReBuilding Exchange](#) is a non-profit organization that diverts building materials from landfills by reaching out to contractors to promote deconstruction and making materials accessible for reuse at its warehouse; [The WasteShed](#) is a creative reuse center that accepts

donations of art, craft and school materials for repurposing and low cost resale

- **Detroit, MI**

The [Architectural Salvage Warehouse of Detroit](#) is a non-profit organization that deconstructs buildings in Southeast Michigan and offers the materials for resale

19. **Adopt deconstruction requirements** - Adopt requirements for deconstruction of buildings slated for demolition or substantial demolition.

- [Palo Alto, CA](#)

The City's Green Building ordinance requires 80% of construction and demolition debris to be recycled for most projects. In 2019, a phased in [deconstruction ordinance](#) covering residential and commercial projects was adopted to advance Zero Waste and Climate/Sustainability priorities.

- [Portland, OR](#)

In July 2016, the City adopted an ordinance, effective October 2016, requiring that projects seeking a demolition permit for houses or duplexes built in 1916 or earlier or designated historic resources to fully [deconstruct](#) such structures; the City estimates the ordinance will divert 4,000 tons of materials for reuse annually

20. **Adopt C&D recycling requirements** - Adopt requirements for C&D recycling/reuse in a C&D or Green Building by-law or building permit.

- [Cook County, IL](#)

The County adopted an ordinance, effective November 2012, requiring that 70% of demolition debris from commercial and residential structures (excluding garages and sheds) be recycled during the demolition process, with 5% of the residential structures being reused

- [Fitchburg, WI](#)

The City adopted an ordinance requiring 70% of construction material produced on site be recycled or reused for new commercial and multi-family building construction and demolition

projects; the City also requires contractors to submit a preliminary and final Construction and Demolition Reuse/Recycling Plan

21. **Enact mandatory participation** - Require, through bylaws, proper separation of recyclables from refuse by households and businesses.

- [Cambridge, MA](#)

The City mandates all residents and businesses to separate designated recyclable materials from refuse. See section 8.24.070 of City code "Mandatory Recycling"

- [Vail, CO](#)

In 2014, the Town adopted an ordinance requiring source separation of recyclables by residential, multi-family, and commercial customers

- [District of Columbia, Washington D.C.](#)

The City mandates all residents and businesses to separate designated recyclable materials from refuse

22. **Enforce State Bans** - Massachusetts currently bans materials from landfills and incinerators, but does not routinely enforce these bans on individual generators. Adopt a bylaw to enforce the bans of specific recyclable, compostable or toxic materials from entering local transfer stations, landfills, and incinerators.

- **State of Massachusetts**

[Waste Disposal Bans](#)

[Commercial Food Waste Disposal Ban](#)

- [Seattle, WA](#)

The City prohibits the disposal of certain recyclables – such as paper, cardboard, glass, plastic, and aluminum cans – from residential, commercial, and self-haul garbage.

Appendix C Methodology

A diversion potential and greenhouse gas (GHG) emissions reduction analysis was conducted to estimate the potential tons of materials and GHG emissions that can be diverted and reduced through the Zero Waste initiatives. The disposal tonnage data for 2021 used in this analysis were obtained from the “2021 DEP data calculation sheet” prepared by the Town of Lexington.

This analysis required the disposal data to be divided into material types based on a material characterization study. The material characterization data used in this analysis were from the “2022 Waste Characterization Study in Support of Class II Recycling Program” report prepared for the Massachusetts Department of Environmental Protection by MSW Consultants (prepared under contract to SAK Environmental, LLC).²

Along with disposal tonnage data and material characterization data, GHG emission factors by material type were used in this analysis. The emission factors used in this analysis were from the US EPA Waste Reduction Model (WARM) tool.³

Each Zero Waste initiative was analyzed to estimate the diversion potential (tons) and the reduced GHG emissions (MTCO₂e). This analysis began by estimating the initiative's capture rate for each material type the initiative is expected to impact (e.g., “Town-wide compost collection” would affect the compostable paper, food and other organics material types only). The capture rate estimation was based on knowledge from other community programs or best estimates based on reports and first-hand knowledge. The capture rate estimates leaned on the side of a conservative estimate.

Next, the estimated capture rate for each material type corresponding to the initiative was multiplied by the estimated tons of material represented in the disposal stream. Next, the tons estimated to be diverted from this initiative for each material type were multiplied by the GHG emission factor. This

² [2022 Waste Characterization Study](#)

³ [US EPA Waste Reduction Model \(WARM\)](#) – version 15

estimated the GHG emissions that were reduced by the initiative by material type. This method was repeated for each material category that related to the initiative.

For each initiative, the tons estimated to be diverted by material type were added to show the total tons estimated to be reduced for that initiative; and the GHG emissions estimated to be reduced by material type were added to show the total MTCO₂e reduced for that initiative. Next, each initiative's capture rate was calculated by dividing the total tons estimated to be diverted by the total tons disposed.

Those steps were repeated for each initiative. Once the diversion potential and GHG emissions were calculated for each initiative, the capture rate, tons diverted, and reduced GHG emission were added by material type. All calculations were double-checked for accuracy.

The last step in this analysis combined the total capture rate, total estimated tons diverted, and total estimated GHG emissions reduced. The total estimated tons diverted through the Zero Waste initiatives were then combined with the baseline (2021) tons diverted to show the increase in total diversion. This analysis illustrated the potential diversion and potential GHG emissions reduced annually once all initiatives were implemented.

Appendix D Funding Opportunities

MassDEP Programs

[Sustainable Materials Recovery Program \(SMRP\) Municipal Grants](#)

Supports local recycling, composting/organics, reuse, source reduction, policy development and enforcement activities that increase diversion and reduce disposal.

[SMRP Recycling Dividends Program \(RDP\)](#)

RDP provides payments to municipalities that have implemented specific programs and policies proven to maximize reuse, recycling, and waste reduction.

[SMRP Municipal Technical Assistance Grants](#)

Applicants can receive up to 80 hours of recycling/solid waste planning assistance from a MassDEP Municipal Assistance Coordinator (MAC).

[Recycling IQ Kit](#)

An open source set of steps, tools and resources to help you increase the quantity and improve the quality of recycling in your community.

[Reduce, Reuse, Repair Micro-Grants](#)

Grants of up to \$5,000 to municipalities, regional authorities, and eligible organizations for short-term waste reduction projects.

[Recycling & Reuse Business Development Grants](#)

Helps Massachusetts recycling processors and manufacturers create sustainable markets for eligible materials.

Related Offerings

[Massachusetts Recycling Loan Fund](#)

Provides loans of up to \$500,000 to help Massachusetts businesses obtain the capital they need for recycling-related activities.

[EPA Sustainable Food Management Grants](#)

Funding and other assistance for reducing commercial, industrial, and residential food waste.

Financial & Technical Assistance for Anaerobic Digestion Projects

A matrix of grant, loan and assistance programs available to renewable energy developers who are proposing organics processing projects.

Federal Infrastructure Funding - With the passage of the Bipartisan Infrastructure Act, \$325 million is now flowing from the U.S. Environmental Protection Agency (EPA) into local communities, \$250 million for development of facilities and \$75 million for development of outreach and education programs. Other Federal agencies also are funding the growth of recycling infrastructure, including the U.S. Department of Energy, U.S. Department of Labor, and the U.S. Department of Agriculture. There are other federal funding sources for local economic development that have been used to fund recycling infrastructure in other locations.

The Recycling Infrastructure and Accessibility Act directs the U.S. EPA to award grants between \$1 million and \$15 million each for projects that make recycling programs more accessible to rural and disadvantaged communities. Grants would specifically support hub-and-spoke recycling systems featuring transfer stations and those that leverage public-private partnerships.

Industry Funding - Industry has supported significant efforts to increase resident capacity to high quality recycling programs. These include the Closed Loop Fund, Recycling Partnership, and various coalitions such as the American Beverage Association, PET coalition, Polypropylene Coalition, Glass Recycling Coalition, Food Packaging Institute, and carton council. These are all groups actively looking for projects to fund and potential sources for capital investments, including the purchase of recycling carts.

Closed Loop Infrastructure Fund

A social impact fund investing \$100 million in business and municipal efforts to increase the recycling of products and packaging.

Appendix E Industrial, Commercial, and Institutional Generation

This Zero Waste Plan focuses on the diversion and disposal programs that are operated or managed by the Town and reported to the Massachusetts Department of Environmental Protection (DEP). These include:

- Collection programs at residential households, Town offices and facilities, and schools
- Drop-off programs at Hartwell

Town-wide generation also includes materials diverted and disposed by industrial, commercial and institutional (ICI) generators. These tons are not tracked by the Town or the state, but can represent a significant fraction of what is generated within Lexington.

To get an understanding of what might be generated in Lexington, estimates can be made using:

- The number of tons disposed per employee per year by industry in Lexington (using national averages by industry group)
- The proportion of residential versus ICI tons delivered to the North Andover incinerator
- An allocation based on the percent of Lexington employment (0.6%) compared to statewide employment
- A calculation based on 2006 statewide disposal (the last time DEP calculated residential versus ICI tons)

Source	Tons
Calculated based on tons per employee per year by industry	31,365
Industrial Commercial Institutional Tons calculated by on North Andover incinerator percentages (52% ICI waste and 48% residential waste)	9,712
Allocated tons based on percent of state employment	21,269
Calculated tons based on 2006 statewide disposal allocation (62% ICI and 38% Residential)	14,627
Average of all ICI data sources (tons)	19,244

<https://www2.calrecycle.ca.gov/WasteCharacterization/BusinessGroupCalculator>

<https://www.mass.gov/doc/summary-of-waste-combustor-class-ii-recycling-program-waste-characterization-studies/download>

<https://lmi.dua.eol.mass.gov/LMI/EmploymentAndWages#>

These estimates for tons disposed by the Lexington ICI sector in 2021 range from 9,712 to 31,365 tons. The average of all of these sources is 19,244 tons. This is more than double the 8,967 disposal tons for programs that were managed by Lexington in 2021.

The policies, programs and infrastructure identified in this plan, will impact the ICI sector and significantly increase diversion. Using conservative estimates for capture rates by material type, ICI disposal tons can be reduced from 19,244 tons estimated to be disposed in 2021 to 5,678 tons per year within 10 years. This represents a 70% capture rate.